

California's Electricity System Supply & Demand Overview

Jeffrey Byron, Commissioner
California Energy Commission



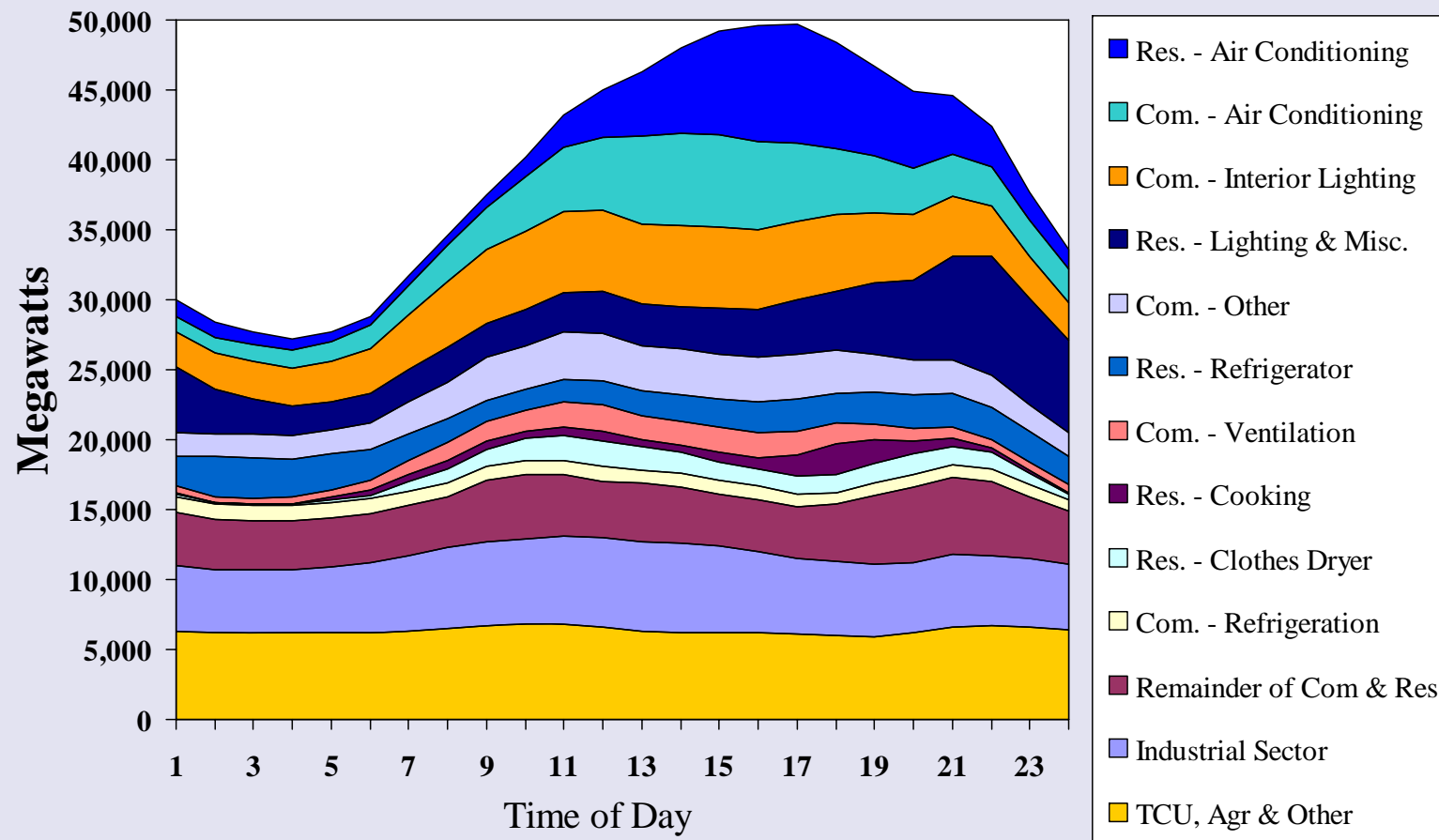
California State Assembly Utilities &
Commerce Committee Informational Hearing
March 29, 2007



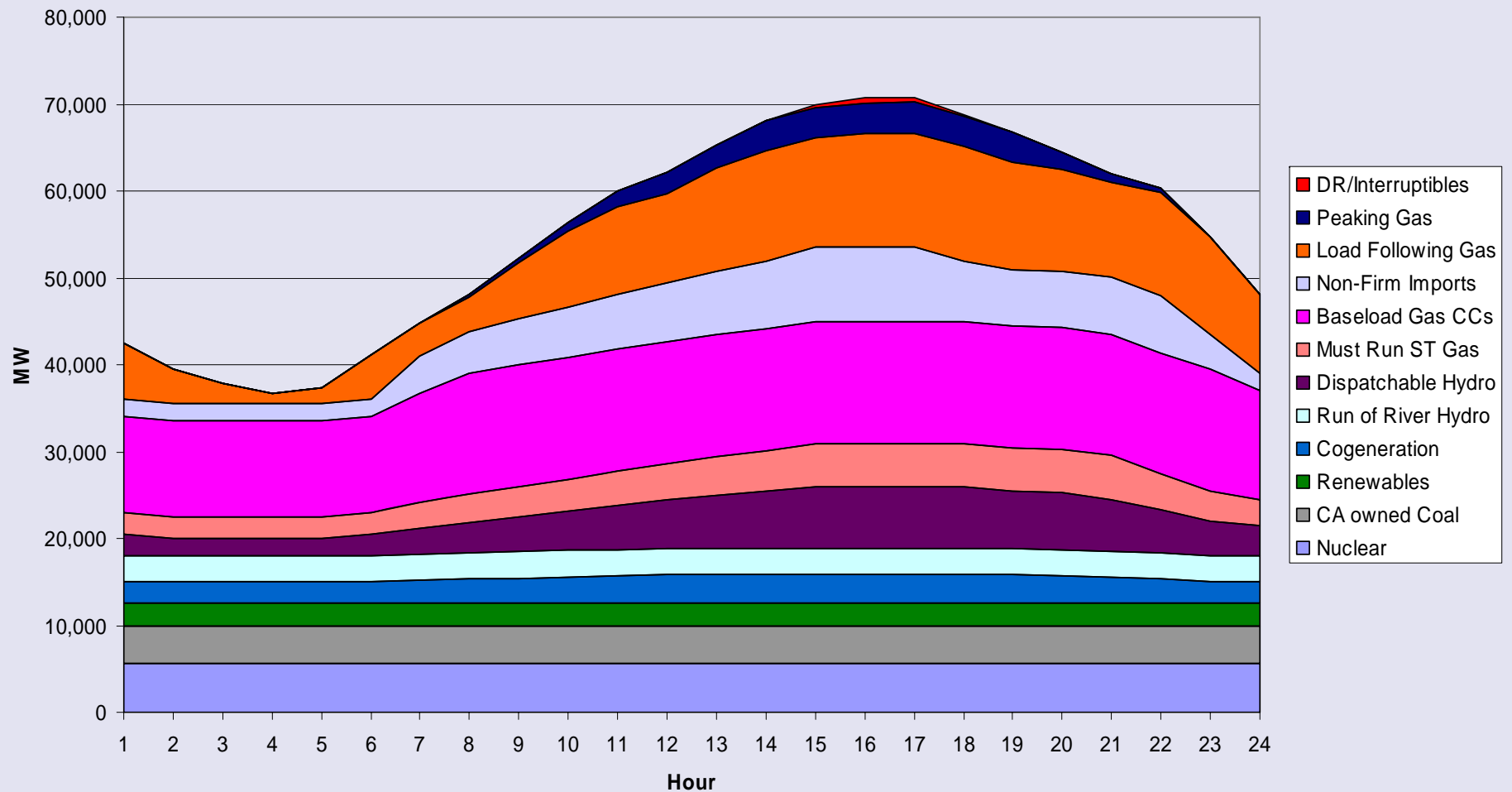
Presentation Topics

- Typical load profiles
- Summary of 2006 Heat Storm
- Review of CA ISO events previous 5 years
- Summer 2007 Outlook

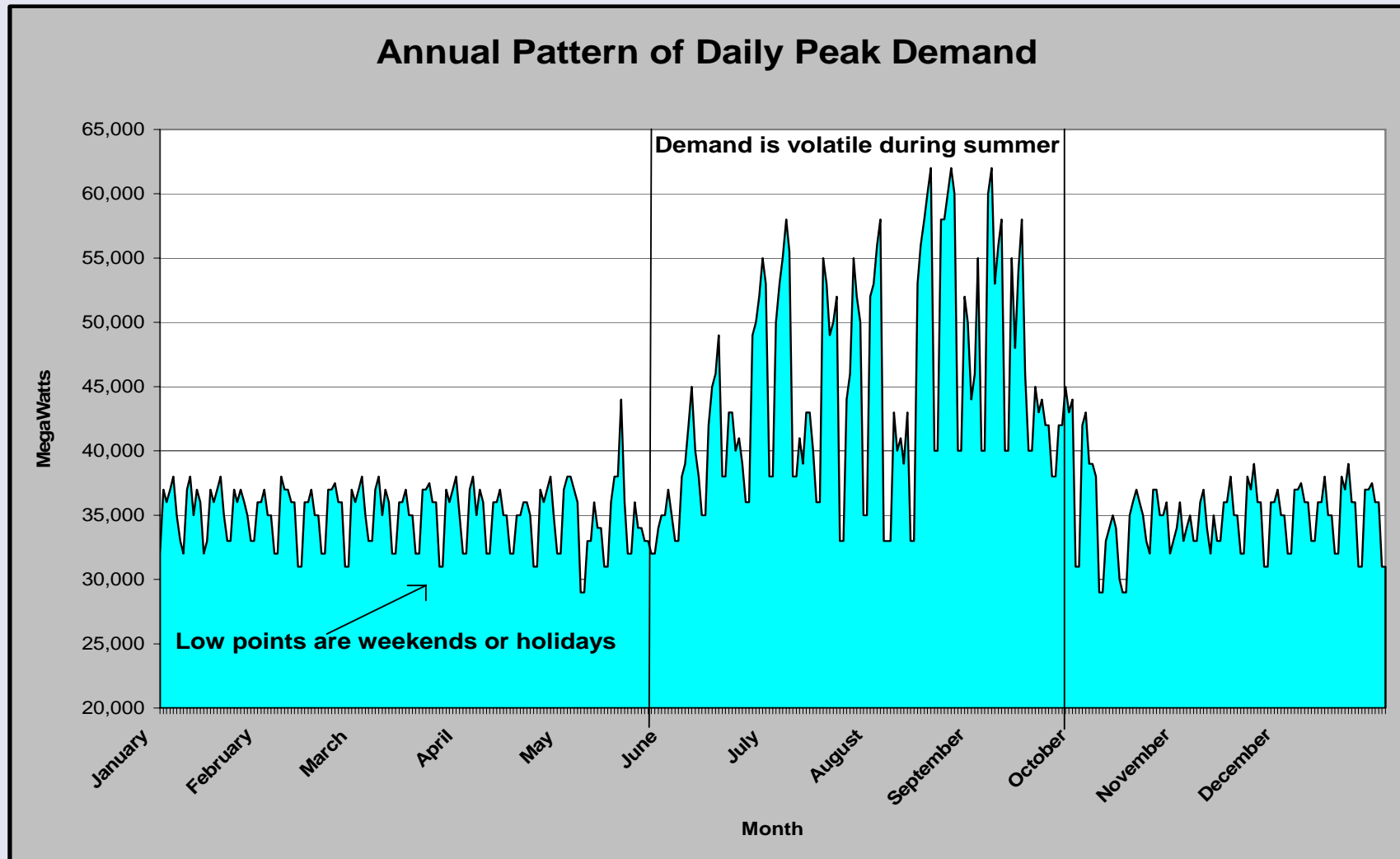
Typical Peak Day Demand Curve



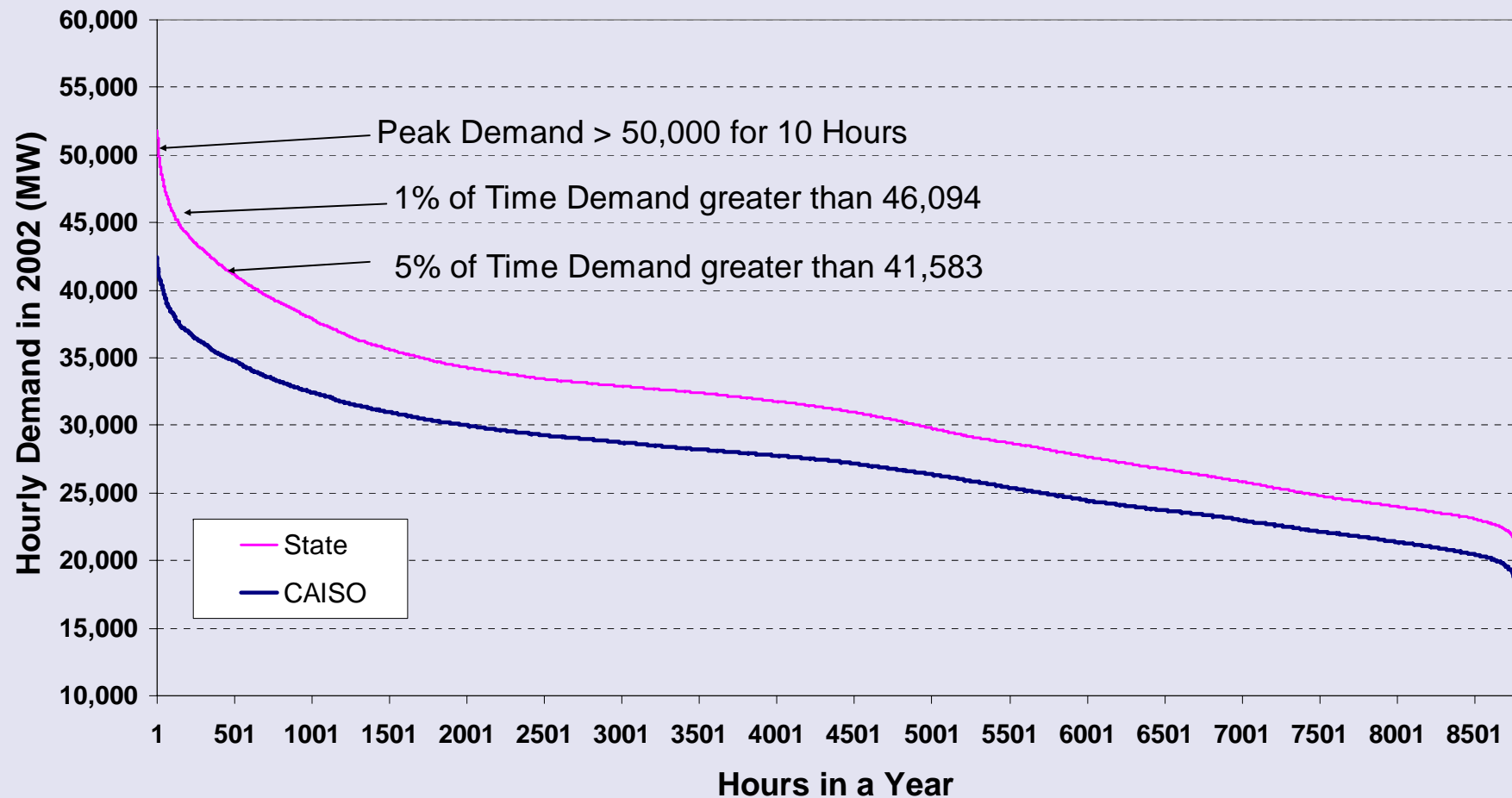
Typical Peak Day Resources



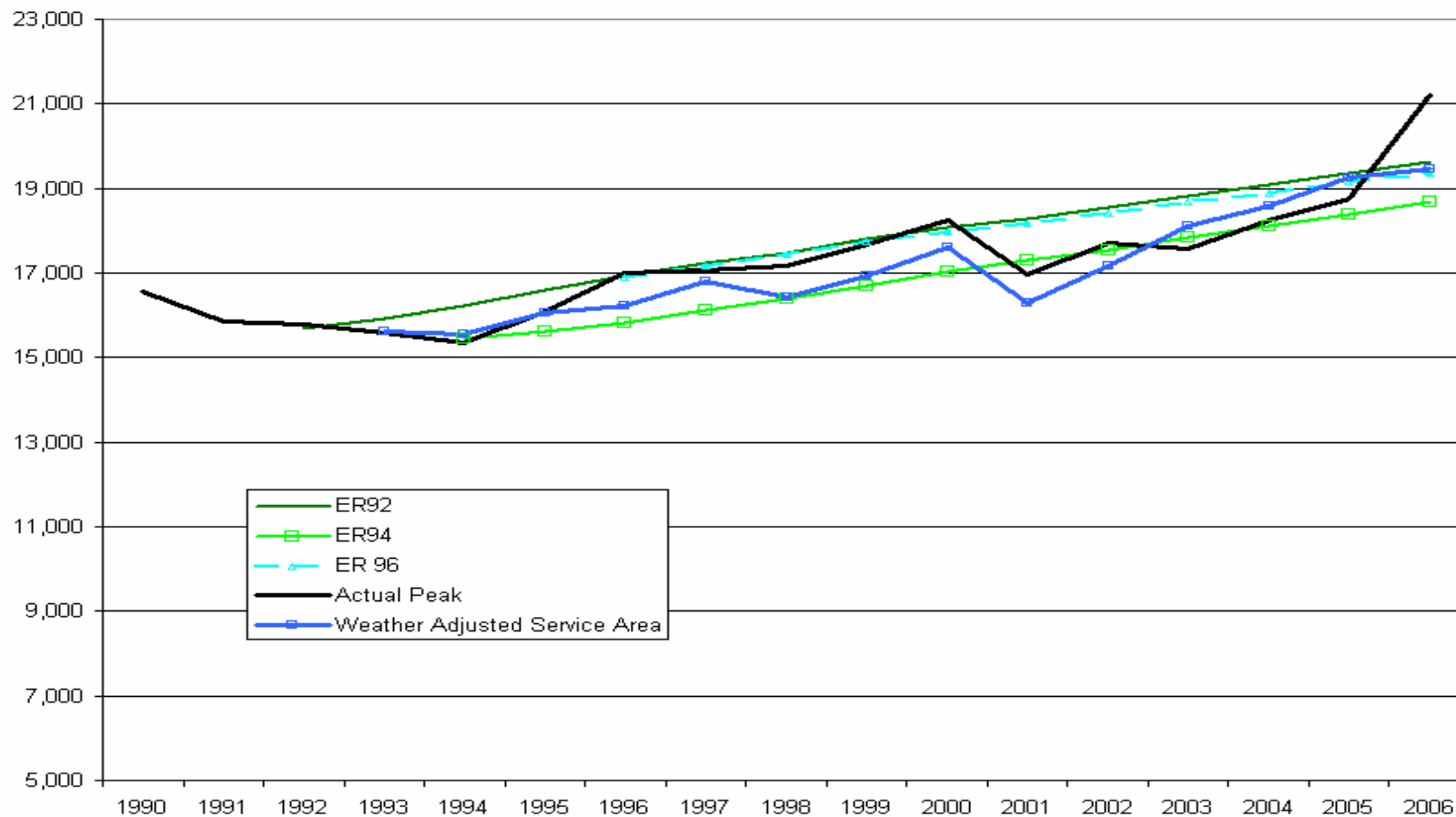
Demand is Volatile During Summer



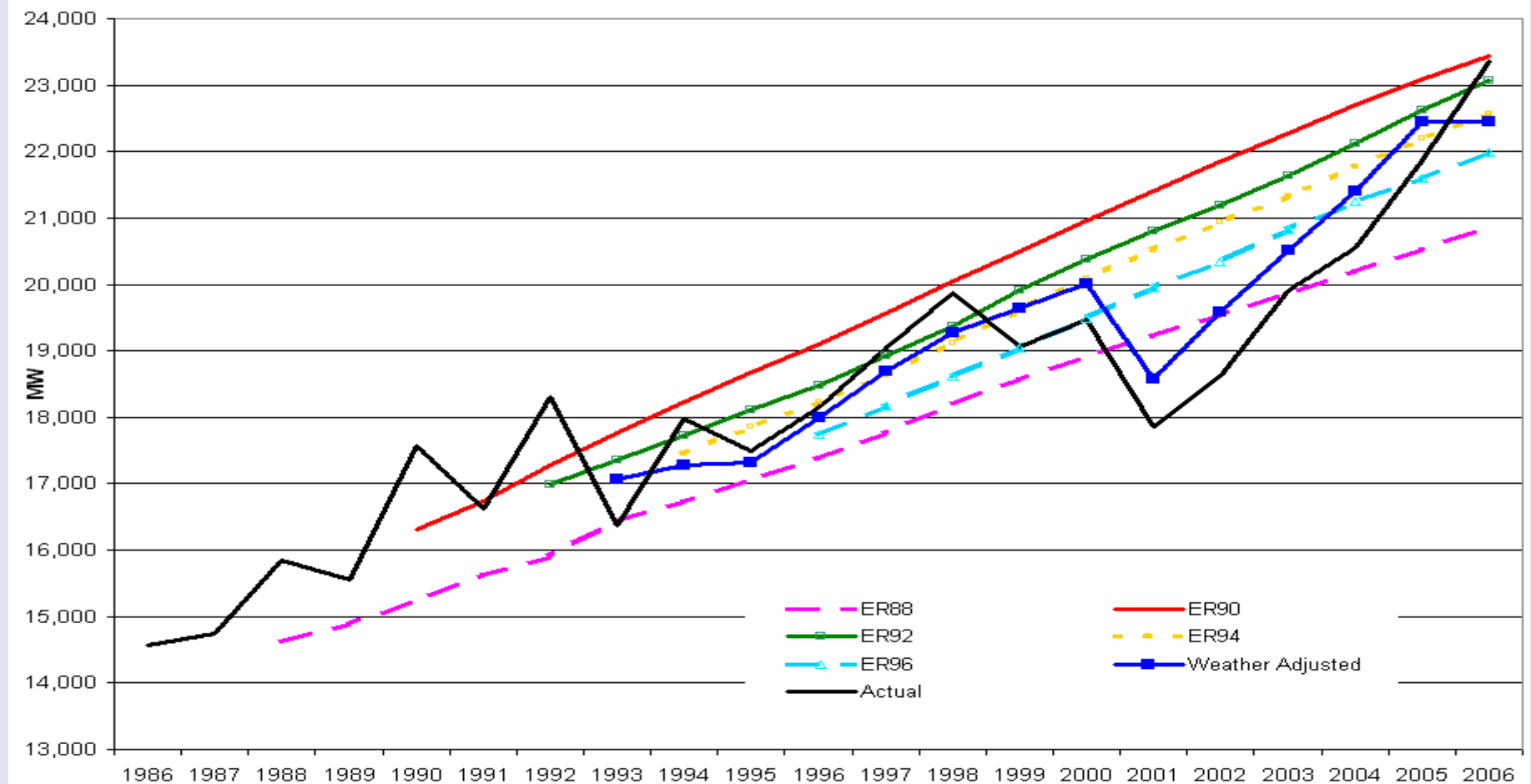
Statewide Load Duration Curve



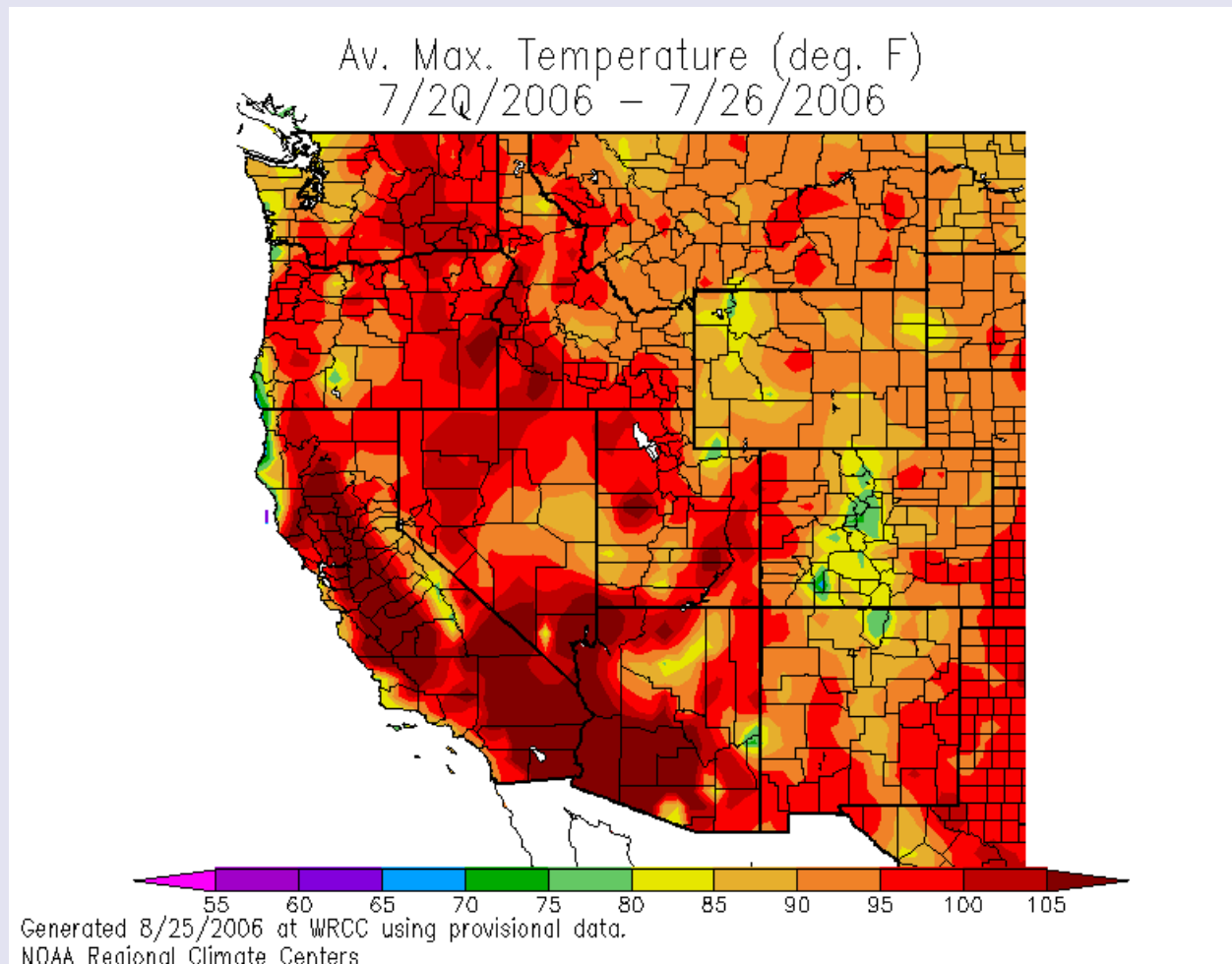
Forecast Versus Actual Peak Demand PG&E Planning Area



Forecast Versus Actual Peak Demand SCE Planning Area

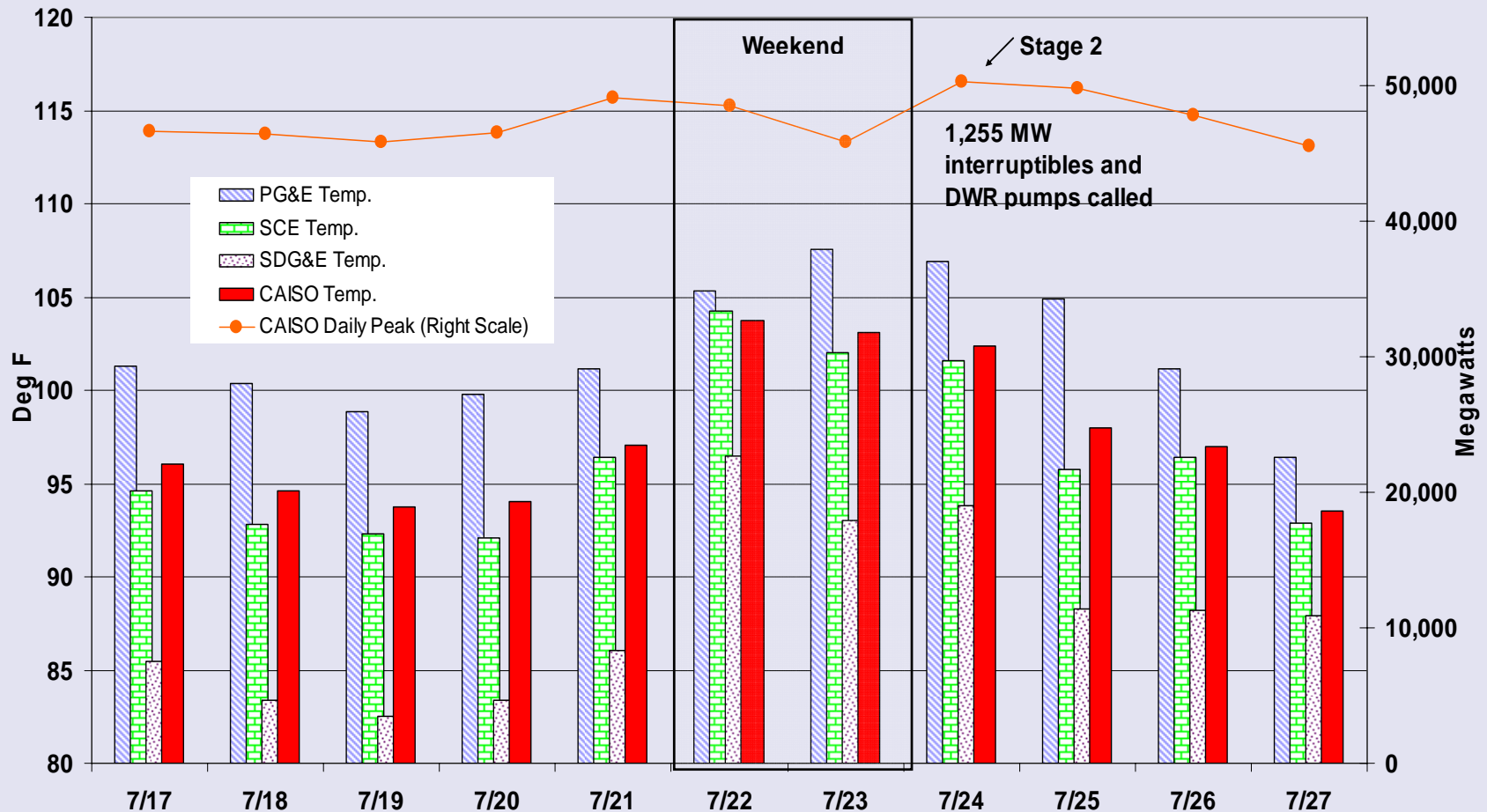


Summer 2006 Heat Storm Temperatures



Summer 2006 Heat Storm

July 17 to 27





Lessons From Heat Storm

What Worked:

- Planning, Coordination, and Communication between System Operators and Resource Providers
 - CA ISO planning efforts
 - Maximized generation and imports
- Demand Response and Interruptible Programs
- Voluntary Conservation
- Resource Adequacy Requirements

What Caused Concerns:

- Distribution System Outages



Looking Ahead To Summer 2007

Do we have enough resources?

The answer to this depends on the time scale:

- ☐ Do we have enough for this summer?
- ☐ Do we have enough for tomorrow or the next hour?

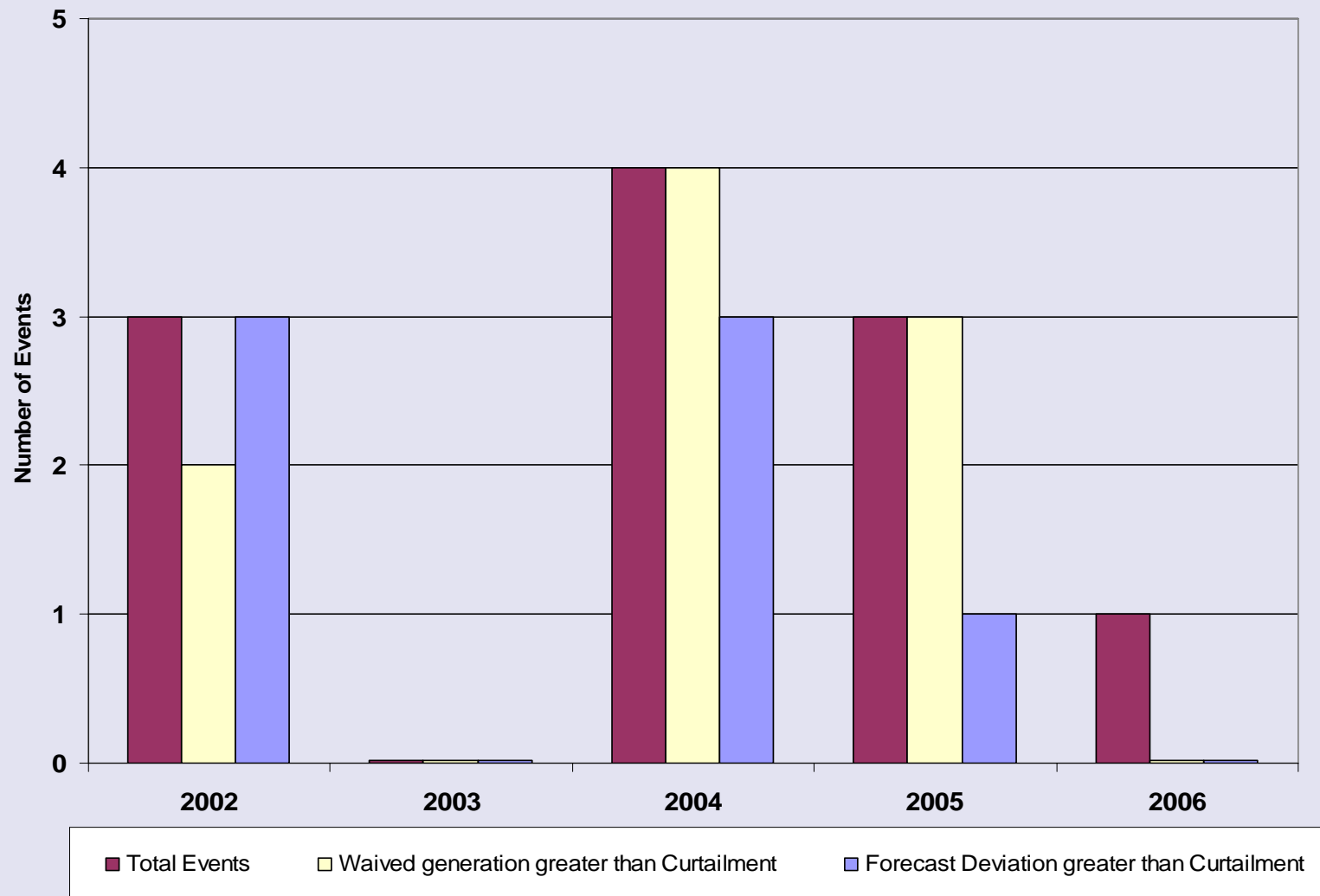
Understanding how the system is operated will help understand how we'll do this summer.



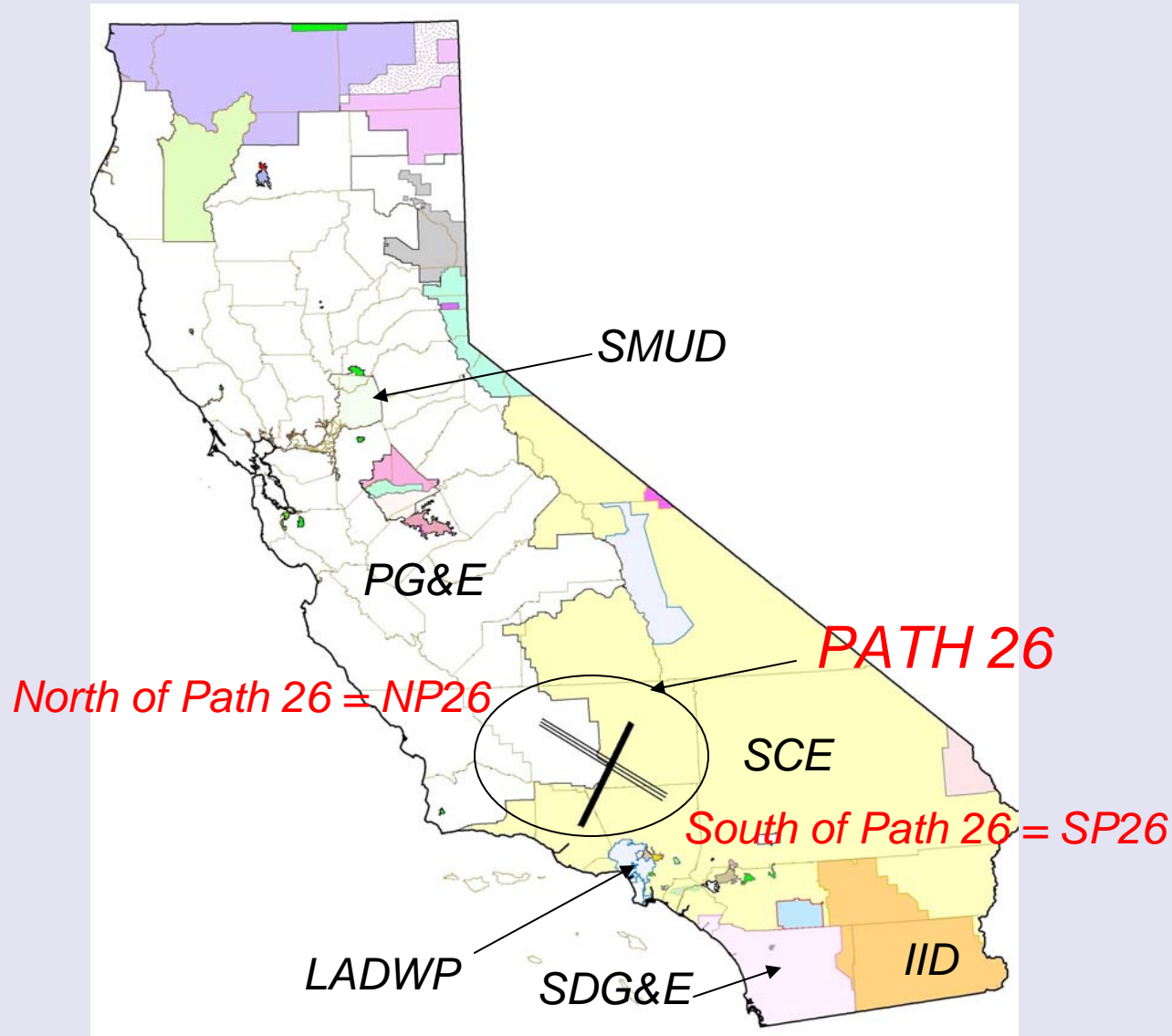
Operating The System

- ISO needs to predict the next day's weather and what transmission and generation will be available
- ISO can obligate some generators to be on-line the next day, but allows those not needed to be off-line to reduce costs
- Weather hotter than predicted the day before or unexpected outages can lead to insufficient resources on-line, even if the resources exist
- The ISO does this very well, and continues to improve
- The ISO's performance in 2006 helped avoid major problems in the system during the July heat storm

Summary Of CA ISO Load Curtailments



Transmission Nomenclature



Summary Of CA ISO Load Curtailments Previous 5 Years

- Two ***Involuntary*** curtailments previous 5 years:
 - 2004 (1) - March 8 (SP26)
 - 2005 (1) - August 25 (SP26)

- Eleven ***Voluntary*** (interruptible) load curtailments previous 5 years:
 - 2002 (3) - June 18 (SP 26), July 10, September 3
 - 2004 (4) - March 8 (SP26), May 3 (SP26), July 20 (SP26), September 14 (Humboldt)
 - 2005 (3) - July 21 (SP26), July 22 (SP26), August 25 (SP26)
 - 2006 (1) - July 24

Options To Reduce Frequency Of Staged Events

■ Increase Planning Reserve Margin

- Pros →
 - Provides more resources at all times
- Cons →
 - Additional cost (at all hours)
 - May have minimal effect on reducing the number of events if resources not added strategically

■ Increase level of DR and Interruptibles

- Pros →
 - Provides greater reserve margins once emergency is called
 - Reduces need for additional generation resources.
- Cons →
 - Additional cost (at all hours)
 - May have minimal effect on reducing the number of events

■ Change DR and Interruptible tariffs

- Pros →
 - Reduces probability of emergencies being called
 - Better Alignment of these resources with Loading Order
 - Public is altered less, only for true emergencies
- Cons →
 - May increase the frequency of using of these resources
 - May reduce customer participation

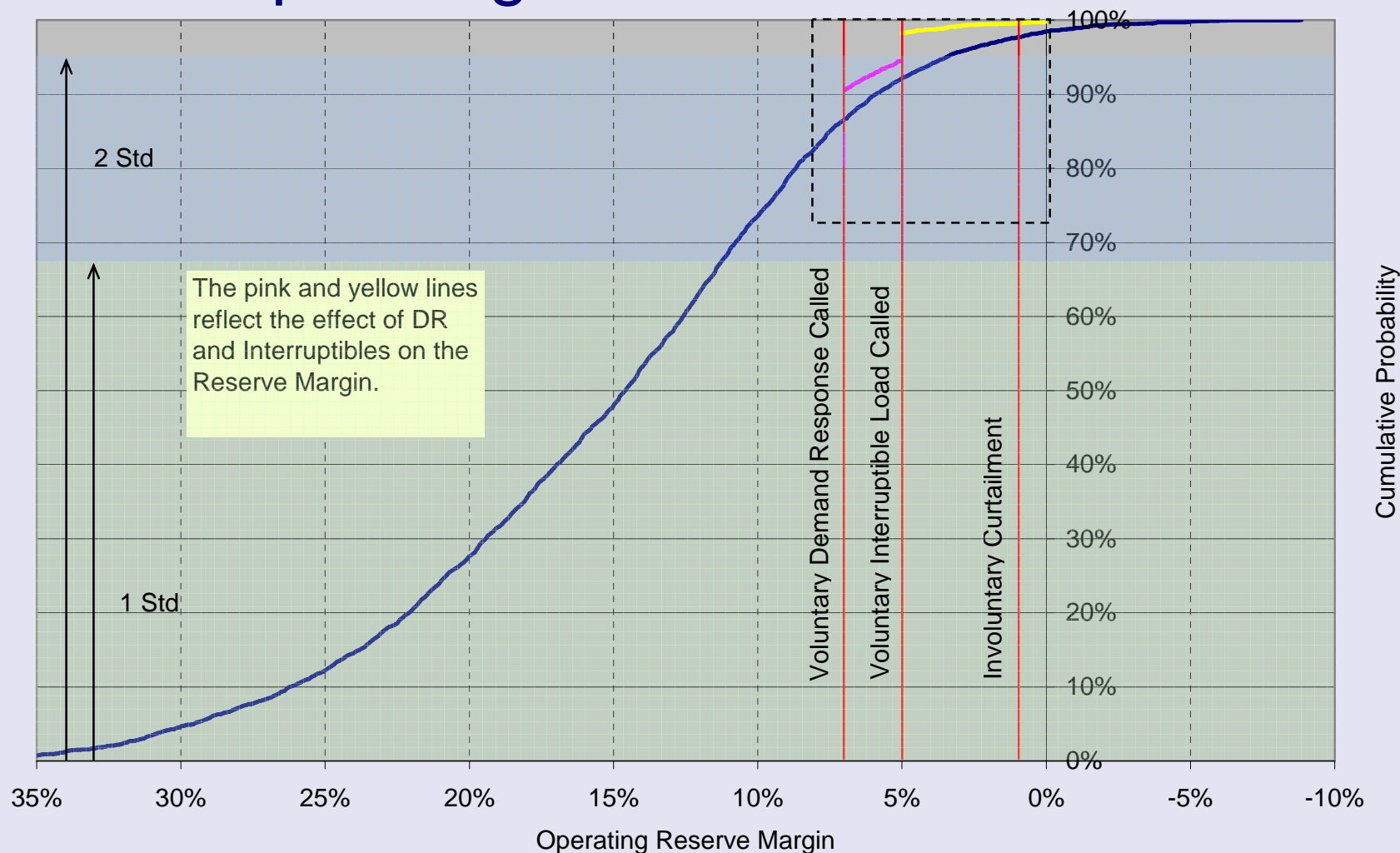


How Does The 2007 Summer Look?

2007 California Statewide Summer Outlook

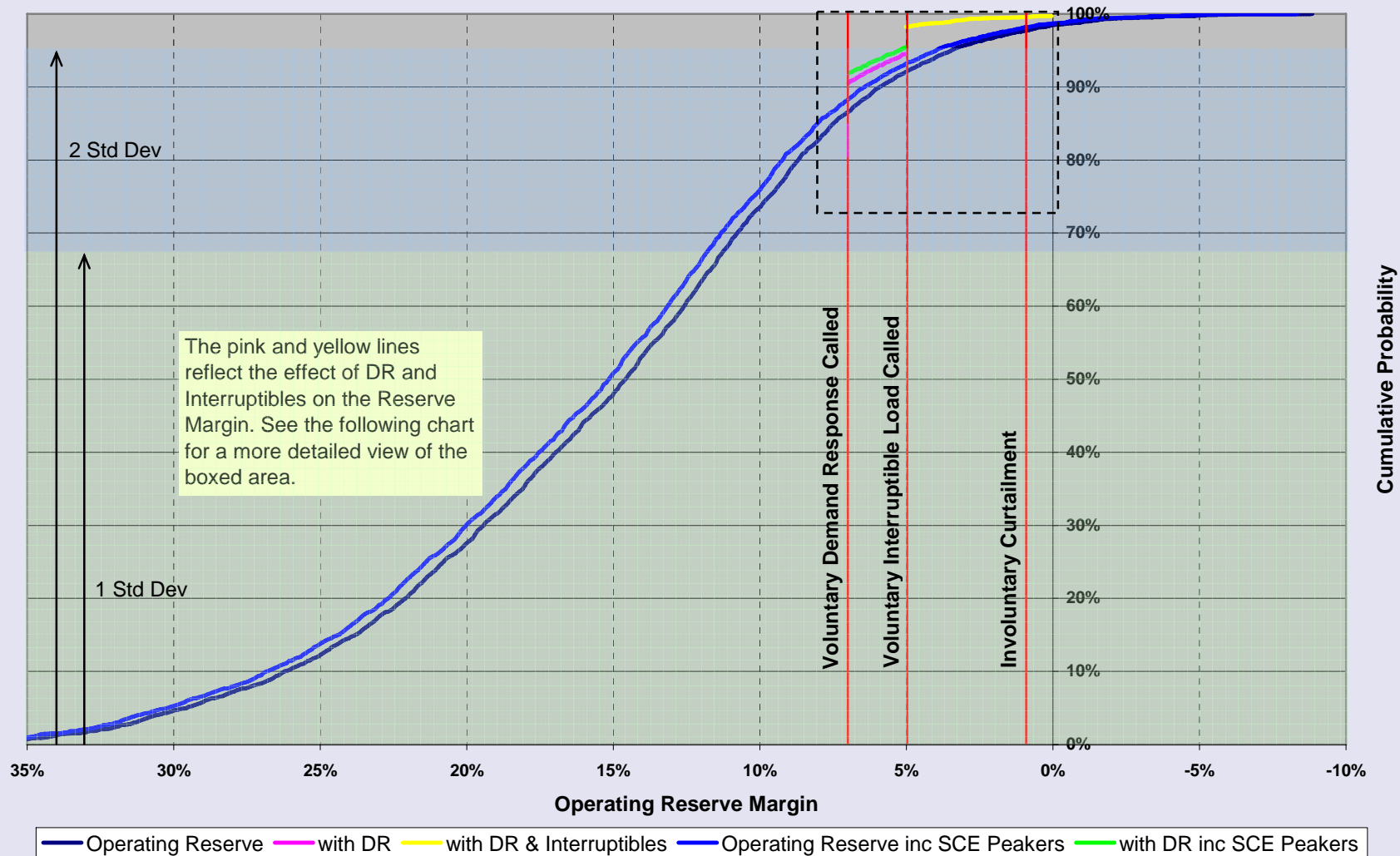
Resource Adequacy Planning Conventions	June	July	August	September
1 Existing Generation ¹	57,897	57,971	58,209	58,538
2 Retirements (Known)	0	0	0	0
3 High Probability CA Additions	74	238	329	0
4 Net Interchange ²	13,118	13,118	13,118	13,118
5 Total Net Generation (MW)	71,089	71,327	71,656	71,656
6 1-in-2 Summer Temperature Demand (Average) ³	57,125	59,726	60,344	59,419
7 Demand Response (DR)	524	524	524	524
8 Interruptible/Curtailable Programs	1,603	1,603	1,603	1,603
9 Planning Reserve ⁴	28.2%	23.0%	22.3%	24.2%
Expected Operating Conditions				
Total Net Generation (MW)	71,089	71,327	71,656	71,656
10 Outages (Average forced + planned)	-2,695	-2,695	-2,695	-2,695
11 Zonal Transmission Limitation ⁵	-150	-150	-150	-150
12 Expected Operating Generation with Outages/Limitations ⁶	68,244	68,482	68,811	68,811
13 Expected Operating Reserve Margin (1-in-2) ⁷	24.7%	18.4%	17.6%	19.9%
Adverse Conditions				
14 High Zonal Transmission Limitation	-250	-250	-250	-250
15 High Forced Outages (1 STD above average)	-1,160	-1,160	-1,160	-1,160
16 1-in-10 Summer Temperature Demand	60,573	63,330	64,040	63,005
17 Adverse Scenario Reserve Margin ⁷	12.9%	7.3%	6.5%	8.6%
18 Adverse Scenario Reserve Margin w/DR and Interruptibles ⁸	17.3%	11.5%	10.6%	12.8%
19 Resources needed to meet 7.0% Reserve (W/DR & Interruptible)	0	0	0	0
20 Surplus Resources Above 7.0% Reserve (W/DR & Interruptible)	4,997	2,284	1,854	2,961
21 Existing Aging Generation Without Capacity Contracts ⁹	-2,070	-2,070	-2,070	-2,070

Probability Of Meeting Summer 2007 Operating Reserve In CA ISO*

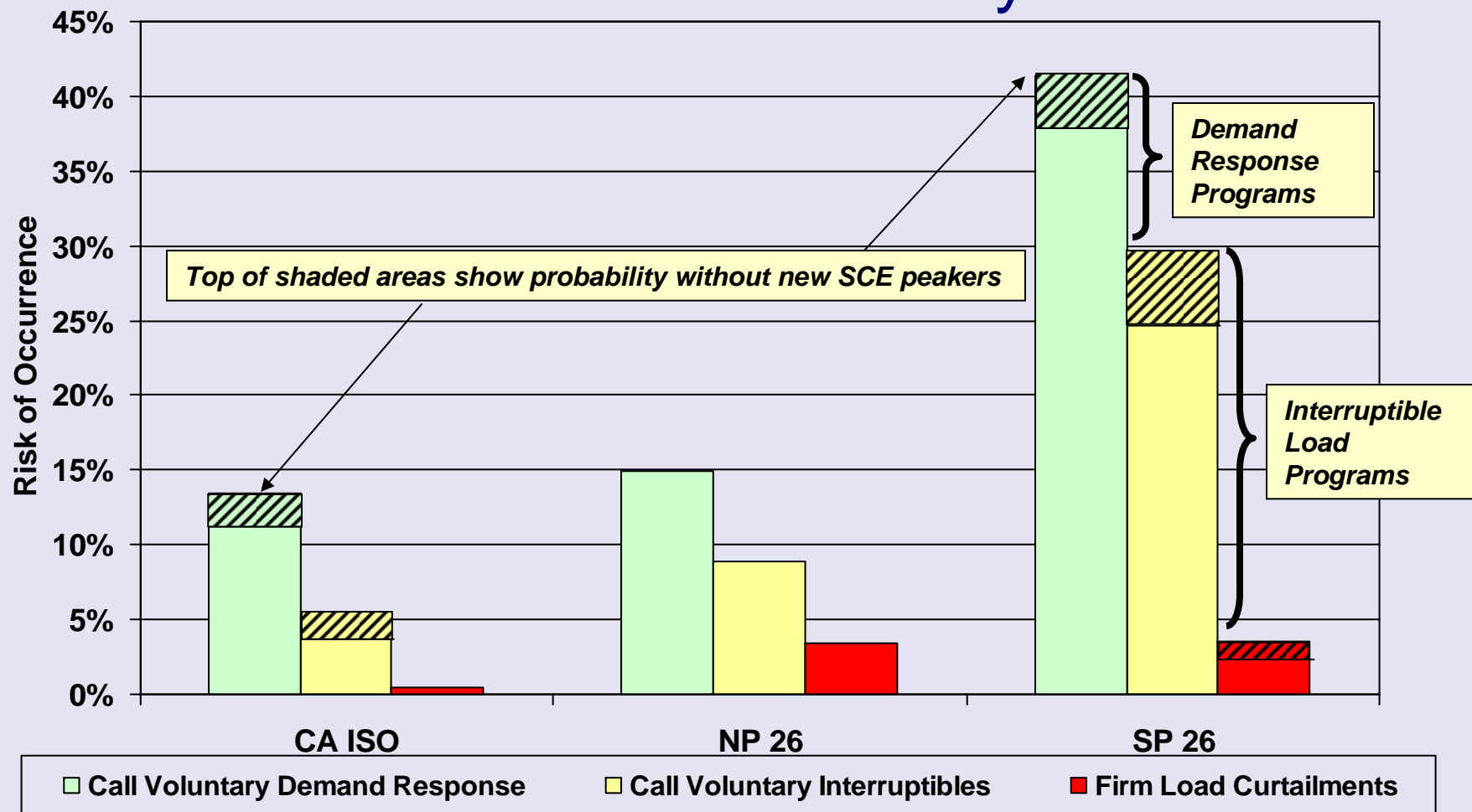


* Does not include new SCE Peakers

Probability Of Meeting Summer 2007 Operating Reserve In CA ISO



Probability Of Events For The 2007 Summer Peak Day





Preparing For Summer 2007

- CEC, CPUC, and CA ISO working together to ensure that we take all appropriate steps to prepare for the Summer of 2007
- Continued implementation of resource adequacy rules will help this summer